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In re Application of MCDUFF et al.

Application No.

Examiner:

Filed: Herewith

Group Art Unit:

For: ANCHOR FOR HOLLOW WALLS

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Sir:

Please find attached a copy of the International application as filed. Please note that the claims attached hereto are for information purposes only, as they are amended in a preliminary amendment filed herewith.

Respectfully submitted,

Dated: 6-10-05

  
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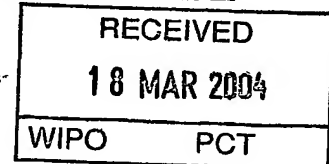
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Specification and Drawings, as originally filed, with Application for Patent Serial  
No: 2,414,436, on December 11, 2002, by **COBRA FIXATIONS CIE LTEE - COBRA  
ANCHORS CO. LTD.**, for "Anchor for Hollow Walls".

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ABSTRACT

An anchor for mounting to a hollow wall made of friable material comprises a proximal flanged end adapted to be engaged by a rotatable tool to rotate the anchor about a longitudinal axis thereof and to cause it to gradually engage the wall, a distal end adapted to cut through the wall as the anchor is rotated, and a shank extending between the proximal and distal ends. The shank includes at least one expandable leg that is in a collapsed position thereof when the anchor is rotated to mount it to the wall and that is located distally beyond a non visible surface of the wall once the anchor has been mounted to the wall and is in a first position thereof. The wall anchor includes a thread that is securely engaged in the wall when the anchor is in its first position. The wall anchor is adapted to receive a threaded fastener, e.g. a screw, therein and to threadably engage the same distally of the leg such that sufficient rotation of the threaded fastener retracts the distal end towards the proximal end thereby causing the leg to displace to an expanded position thereof, the leg in this expanded position engaging the non visible surface of the wall.

## ANCHOR FOR HOLLOW WALLS

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

5       The present invention relates to wall anchors and, more particularly, to anchors for use typically in hollow walls made of friable materials, e.g. gypsum.

#### 2. Description of the Prior Art

10       The Ernst et al, Gianuzzi and McSherry U.S. Patent Nos. 4,601,625, 5,234,299 and 5,529,449, respectively, each disclose an anchor which is turned in a wall made of friable material and is retained in the wall by virtue of the friable material being compressed  
15       between the root and deep thread spiraled along the cylindrical body of the anchor and between the proximal end of the thread and flanged end of the anchor which becomes embedded in the front surface of the wall. A work piece is then fastened to the wall by a screw fastener  
20       which is screwed into the open end of the anchor and holds the workpiece between the flanged end of the anchor and the head of the screw fastener.

      Toggle bolts are also known, wherein a hole is first drilled in the wall before the toggle bolt (with  
25       its toggle in its retracted position, i.e. extending axially along with the anchor section of the toggle bolt) is inserted longitudinally in the hole and through the wall, following which the toggle is caused to displace to its extended position wherein it extends at right angles  
30       to the anchor section and behind the hollow wall. In some cases, the toggle bolt has a pointed distal end so that it can be hammered into the wall but this causes at least a rear portion of the friable wall to explode. Also, there is a toggle bolt that can be screwed through the  
35       wall, although when fully inserted it has no threads engaged into the wall.

SUMMARY OF THE INVENTION

It is therefore an aim of the present invention to provide an improved anchor adapted to be securely mounted to a hollow wall such that an object can be attached thereto, e.g. an elongated fastener, which in turn can be used to hold an item on/to the wall.

Therefore, in accordance with the present invention, there is provided an anchor for mounting to a hollow wall, comprising a proximal end adapted to be engaged by a rotatable tool to rotate said anchor about a longitudinal axis thereof and to cause it to gradually engage a wall, a distal end adapted to cut through the wall as said anchor is rotated, and a shank between said proximal and distal ends, said shank including at least one expandable leg, said expandable leg being in a collapsed position thereof when said anchor is rotated to mount it to the wall and being located distally passed a non visible surface of the wall once said anchor is mounted to the wall and is in a first position thereof, said anchor including a thread engaged in the wall when said anchor is in said first position, said anchor being adapted to receive a threaded fastener therein and to threadably engage the same distally of said leg such that sufficient rotation of the threaded fastener retracts said distal end towards said proximal end thereby causing said leg to displace to an expanded position thereof, said leg in said expanded position engaging the non visible surface of the wall.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings, showing by way of illustration a preferred embodiment thereof, and in which:

Fig. 1 is a schematic side view showing a first wall anchor in accordance with the present invention engaged into a wall and in a first position thereof;

Fig. 1a is an end view of the wall anchor of  
5 Fig. 1;

Figs. 1b and 1c are end views of variants of the wall anchor of Figs. 1 and 1a;

Fig. 2 is a schematic side view, similar to Fig. 1, but showing the wall anchor of Fig. 1 in a second  
10 position thereof;

Fig. 2a is an end view of the wall anchor of Fig. 2;

Figs. 2b and 2c show the variants of Figs. 1 b and 1c in the second position of the wall anchor;

Fig. 3 is a schematic side view of a second  
15 wall anchor in accordance with the present invention which is similar to Fig. 1 and which is shown in a first position thereof;

Figs. 3a to 3c are similar to Figs. 1 a to 1c, but pertain to the wall anchor of Fig. 3;  
20

Figs. 4 and 4a to 4c are similar to Figs. 2 and 2a to 2c, but pertain to the second wall anchor of Fig. 3 that is shown in a second position thereof;

Fig. 5 is a schematic side view of a third wall  
25 anchor in accordance with the present invention, shown in a first position thereof;

Fig. 5a is an end view of the wall anchor of Fig. 5;

Fig. 6 is a schematic side view of the wall  
30 anchor of Fig. 5, but showing the wall anchor in a second position thereof;

Fig. 6a is an end view of the wall anchor of Fig. 6;

Figs. 7 and 7a to 7c are similar to Figs. 1 and  
35 1a to 1c, but show a fourth wall anchor in accordance

with the present invention and in a first position thereof;

5 Figs. 8 and 8a to 8c are similar to Figs. 2 and 2a to 2c, but pertain to the wall anchor of Fig. 7 that is shown in a second position thereof;

Figs. 9 and 9a to 9c are similar to Figs. 1 and 1a and 1c, but show a fifth wall anchor in accordance with the present invention and in a first position thereof;

10 Figs. 10 and 10a to 10c are similar to Figs. 2 and 2a to 2c, but pertain to the wall anchor of Fig. 9 that is shown in a second position thereof;

Fig. 11 is a schematic side view of a sixth wall anchor in accordance with the present invention, shown in a first position thereof;

15 Fig. 12 is a view similar to Fig. 11, but shows the sixth wall anchor in a second position thereof;

Fig. 13 is a side view similar to Fig. 1, but shows a seventh wall anchor in accordance with the present invention and in a first position thereof;

20 Fig. 14 is a side view of the wall anchor of Fig. 13, but in a second position thereof;

Fig. 15 is a side view of an eighth wall anchor in accordance with the present invention, shown in a first position thereof;

25 Fig. 16 is a side view of the wall anchor of Fig. 15, but shown in a second position thereof;

Fig. 17 is a side view of a n anchor section of the wall anchor of Fig. 15;

30 Fig. 18 is a side view of a locking member of the wall anchor of Fig. 15;

Fig. 19 is a side view of a ninth wall anchor in accordance with the present invention;

35 Fig. 20 is an end view of the wall anchor of Fig. 19; and

the distal tip 12 assisting in penetrating the wall 10 and with the threads 14 and 22 consecutively engaging the friable material of the wall W and, in fact, tapping the same such that the wall anchor 10 is secured to the wall by way of the threads 22. The opening 16 assists in 5 evacuating the friable material that has been removed from the wall W by the wall anchor 10. Once the wall anchor 10 is in its position shown in Fig. 1 with respect to the wall W, the screw S, with or without the item I located between the head of the screw S and the visible 10 surface of the wall W, is rotatably engaged into the wall anchor 10 until it assumes its position shown in Fig. 1.

Once the head of the screw S cannot further axially translationally advance (in Fig. 1 because of its 15 abutment with the item I, or alternatively because it has engaged the visible surface of the wall W), further rotation of the screw S causes the distal tip 12 of the wall anchor 10 to be pulled towards the wall W in view of the threaded engagement between the screw S and the wall 20 anchor 10, typically at section 28 thereof that has been tapped by the screw S. The gradual retraction of the distal tip 12 towards the head 18 causes the legs 24 to outwardly expand and, initially, any frangible film 26 between adjacent legs 24 is ruptured.

Each leg 24 has a shorter proximal portion 30 25 and a longer distal portion 32. The expansion of the legs 24 is interrupted by the proximal leg portions 30 abutting the non-visible surface of the wall W, as seen in Fig. 2, in which position the proximal and distal leg 30 portions 30 and 32 form with the screw S a substantially right angled triangle. Additionally, the shank 20, for instance inwardly of (i.e. within) the legs 24, may include a stopper which, for example, extends around the screw S and which extends rearwardly from a proximal end 35 of the distal tip 12. Such a stopper does not extend the



full length of the legs 24 when they are in their  
 collapsed position of Fig. 1, such that a proximal end of  
 the stopper engages, in Fig. 2, the non -visible surface  
 of the wall W inwardly of the proximal leg portions 30 of  
 5 the legs 24 and/or the inner ends of the proximal leg  
 portions 30 , thereby significantly impeding furt her  
 retraction of the distal tip 12 towards the wall W. Even  
 though the proximal leg portions 30 , when they engage the  
 non-visible surface of the wall W, offer resistance to  
 10 such a further retraction of the distal tip 12, over  
 rotation of the screw S coul d cause the proximal leg  
 portions 30 to dig into the wall W. With the stopper,  
 which is of a length which substantially correspond to  
 the third side of the right angled triangle that has the  
 15 proximal and distal leg portions 30 and 32 as its two  
 other sides, it is ensured that the end position of the  
 wall anchor 10 will be that illustrated in Fig. 2. In  
 other words, the proximal leg portions 30 and/or the  
 stopper will substantially prevent the screw S from being  
 20 over-rotated.

Figs. 1b, 2b, 1c and 2 c show alternate shanks  
 which, instead of having four legs 24 as in Figs. 1 and  
 2, have five and three such legs. Other numbers of legs  
 can also be contemplated.

25 Figs. 3 and 4 illustrate a second wall anchor  
 110, also in accordance with the present invention, which  
 is similar to the first wall anchor 10, except that a  
 shank 120 of the wall anchor 110 includes therearound a  
 thread 121 that is substantially continuous with the  
 30 threads 114 and 122. Also, in the wall anchor 110, the  
 proximal and distal leg portio ns 130 and 132 of the legs  
 124 thereof are of a same length such that they assume  
 the general flattened end position shown in Fig. 4, with  
 the threads 121 of the proximal leg portion 130 engaging  
 35 the non-visible surface of the wall W. In Figs. 3 and 4,

the screw S that is illustrated has a larger pitch wood -  
 type thread that makes the installation of the screw S  
 (including the expansion of the wall anchor 110) faster,  
 i.e. with less rotations being required from the screw S.  
 5 As for the first wall anchor 10, the second wall anchor  
 110 includes a distal tip 112, an opening 116, a head 118  
 and a tapped section 128, and can also include frangible  
 films, such as frangible films 26 of wall anchor 10.

10 Figs. 3B, 4B, 3C and 4C show variations of the  
 wall anchor 110, i.e. with five and three legs instead of  
 the four legs 124 shown in Figs. 3 and 4.

As a variant to the second wall anchor 110 (and  
 possibly also to other wall anchors, e.g. to the first  
 wall anchor 10), the section 128 of the shank 120 can  
 15 include a metal insert provided with inner threads (i.e.  
 it does not need to be tapped by the screw S) and  
 mounted, for instance moulded, into the plastic shank 120  
 of the wall anchor 110, the inner threads of such a metal  
 insert being typically adapted to receive a machine  
 20 screw.

Figs. 5 and 6 illustrate a third wall anchor  
 210, which is somewhat similar to the first wall anchor  
 10, except that it includes only two, diametrically  
 opposed, legs 224. A pair of stoppers 234 are part of  
 25 the shank 220 and extend between the legs 24 rearwardly  
 from a proximal end of the distal tip 212. The proximal  
 ends of the stoppers 234 are adapted to limit the  
 retraction of the distal tip 212 towards the head 218  
 such that the wall anchor 210 assumes, in its final  
 30 position, the general configuration shown in Fig. 6.

The wall anchor 210 further includes a distal  
 thread 214, a distal opening 216, a proximal thread 222,  
 a tapped section 228 and proximal and distal leg portions  
 230 and 232.

Fig. 21 is a cross-sectional view of the wall anchor of Fig. 19.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 In accordance with the present invention, Fig. 1 illustrates a wall anchor 10 in its first, i.e. insertion, position, with Fig. 1 showing the wall anchor 10 fully inserted through a wall W and with a screw S engaged in the wall anchor 10 and holding an item I  
10 against the wall W. In Fig. 2, the wall anchor 10 is shown in a second, i.e. expanded, position thereof wherein the wall anchor 10 is further secured to the wall W, as explained in details hereinafter. The wall anchors described herein are generally all made of plastic  
15 material.

The wall anchor 10 is hollow, for receiving the screw S therein, and comprises a pointed distal tip 12 provided with a partial thread 14 therearound and defining an opening 16. Proximally, the wall anchor 10  
20 includes a head 18 and, between the head 18 and the distal tip 12, the wall anchor 10 comprises a shank 20. The proximal portion of the shank 20 includes a thread 22 and, between the threads 14 and 22, the shank 20 includes a system of expandable legs 24. In the embodiment shown  
25 in Figs. 1 and 2, the shank 20 includes four such legs 24 which, in the collapsed position of Fig. 1, are linked together by frangible films 26, although such films can be absent, in which case the legs 24 extend along side each other but are not connected together.

30 The head 18 can be engaged by a torque driven rotational tool, such as a screwdriver, manual or powered. For instance, the head 18 can define a cruciform recess (see Fig. 20) for receiving a Phillips-type screwdriver bit. This allows the wall anchor 10 to  
35 be rotatably driven, as a screw, through the wall W, with

Figs. 7 and 8 illustrate a fourth wall anchor 310 in which a stopper 334 takes the form of a cylinder that extends rearwardly from the distal tip 312 and within the legs 324. The stopper 334 can take the form, as illustrated, of a rearward extension of the tapped section 328 such that it is also tapped by the screw S. The number of legs 324 in the shank 320 can vary, as seen for instance in Figs. 7a and 8a, 7b and 8b, and 7c and 8c where four, five and three legs are illustrated respectively.

The fourth wall anchor 310 also includes a distal thread 314, a distal opening 316, a proximal head 318, a proximal thread 322 and proximal and distal leg portions 330 and 332. Frangible sections can also be provided between adjacent legs 324, as in the first wall anchor 10 of Figs. 1 and 2.

Figs. 9 and 10 illustrate a fifth wall anchor 410 also in accordance with the present invention, which is similar to the first wall anchor 10 of Figs. 1 and 2, but which shows a variant distal tip 412 that is based on the distal section of the self-drilling anchor of aforementioned U.S. Patent No. 5,234,299. The distal tip 412 of the wall anchor 410 could also take the shape of the blade of the self-drilling threaded insert of aforementioned U.S. Patent No. 4,601,625. In fact, these variant distal tips as well as others can be contemplated for the various wall anchors disclosed herein.

With the illustrated distal tip 412, the wall anchor 410 is initially punched through the wall W before being rotated such that the proximal threads 422 thereof engage the wall W. The wall anchor 410 also includes a head 418, a shank 420, legs 424, a tapped section 428 and proximal and distal leg portions 430 and 432.

Figs. 9a and 10a show the shank 420 having four legs 424 as in Figs. 9 and 10, whereas Figs. 9b, 10b, 9c

and 10 c show alternate leg configurations consisting of five and three legs 424.

In Figs. 11 and 12, a sixth wall anchor 510 is shown, wherein a shank 520 includes side-by-side legs 524 which are slightly angled with respect to a longitudinal axis of the wall anchor 510 and in a direction that is opposite the torque exerted when the wall anchor 510 is rotatably inserted in the wall W in order to provide added rigidity to the shank 520 during the rotary installation of the wall anchor 510. The legs 524 are detachably connected together by way of frangible portions 526 which, as in previous embodiments, provide additional rigidity to the shank when compared to legs that are not initially connected together. The shank 520, as the shank 120 of Figs. 3 and 4, includes a threaded 521 that provides with the proximal thread 522 and the distal thread 514 a substantially continuous thread. Once expanded, as seen in Fig. 12, the wall anchor 510 defines a bundle that is in abutment with the non-visible surface of the wall W, this bundle being formed by the deformed legs 524.

The sixth wall anchor 510 also includes a distal tip 512, a distal opening 516, a proximal head 518 and a tapered section 528.

Figs. 13 and 14 show a seventh wall anchor 610 in accordance with the present invention, which is similar to the first wall anchor 10, except that two of its legs 624 expand inwardly, such legs being designated by reference numerals 634 in Figs. 13 and 14. These inwardly deflecting legs 634 act as a stopper to resist further retraction of the distal tip 612 towards the wall W once the wall anchor 610 has generally assumed its second position shown in Fig. 14.

The wall anchor 610 also includes a distal thread 614, a distal opening 616, a head 618, a shank

620, a proximal thread 622, a tapered section 628 and proximal and distal leg portions 630 and 632.

5 Figs. 15 and 16 show an eighth wall anchor 710 in accordance with the present invention that consists of two separate components and, more particularly, of a threaded anchor section 711 (shown in isolation in Fig. 17) and an expandable locking member 724 (shown in isolation in Fig. 18). The anchor section 711 includes a distal tip 712, a distal thread 714, a distal opening  
10 716, a proximal head 718, a shank 720, and a proximal thread 722.

The locking member 724 is initially collapsed, as seen in Fig. 15, being partly received in longitudinal grooves defined on diametrically opposed sides of the  
15 shank 720. The locking member 724 defines a pair of notches 726 that are adapted to engage a proximal end of the shank 720, when the locking member 724 is collapsed, wherein tips 728 defined by the notches 726 are held inwardly of the shank 720. The locking member 724 also  
20 includes a distal cylindrical member 730 that can be tapped by the screw S.

Once the screw S has been sufficiently inserted in the anchor section 711, it contacts the locking member 724 and displaces it axially away from the head 718  
25 thereby disengaging the tips 728 of the locking member 724 from the shank 720 of the anchor section 711. As the locking member 724 is spring loaded, its release from the shank 720 causes it to automatically deploy to its position shown in Fig. 18. The cylindrical member 730 of  
30 the locking member 724 is then tapped by the screw S and with subsequent rotation of the screw S, the locking member 724 is retracted towards the wall W until it assumes the position shown in Fig. 16. In fact, the locking member 724 basically acts as a toggle that is  
35 displaced between a collapsed idle insertion position

(Fig. 15) and a wall -engaging expanded position (Fig. 16).

The locking member 724 is inserted by the manufacturer of the wall anchor 710 through the central bore of the anchor section 711, from the head 718 towards the distal tip 712, that is until the collapsed locking member 724 extends partly in the longitudinal grooves of the shank 720 while the tips 728 of the locking member 724 are prevented from expanding by the proximal end of the shank 722. Again, once the screw S has been sufficiently inserted, it axially moves the locking member 724 along the bore of the anchor section 711 until the tips 728 are disengaged from the shank 720 and are spring biased exteriorly through the longitudinal grooves of the shank 720.

Figs. 19 and 20 illustrate a ninth wall anchor 810 in accordance with the present invention, which is characterized by having inside threads 828 defined in the distal end of the shank 820 and, interruptingly, in the open distal end 812. The threads 828 defined in the shank 820 are continuous, but the inside threads 828 defined in the distal tip 812 are interrupted by the distal opening 816. The inside threads 828 of the wall anchor 810 are obviously adapted to be engaged by the outside threads of the screw S (not illustrated). This configuration provides more threads in the wall anchor 810 that can be engaged by the threads of the screw S thereby providing more strength at the level of the engagement of the screw S with the wall anchor 810, which may thus prevent stripping of the threads 828 of wall anchor 810 when the screw S is further rotated in order to retract the distal tip 812 rearwardly towards the wall for expanding the legs 824 provided on the shank 820.

The wall anchor 810 also includes a distal thread 814, a proximal head 818, a proximal thread 822,

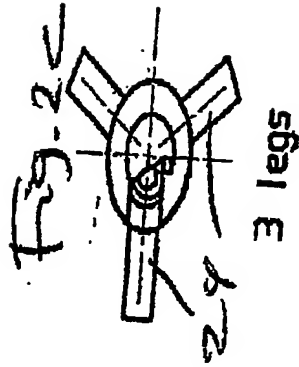
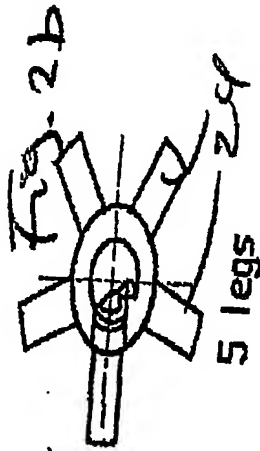
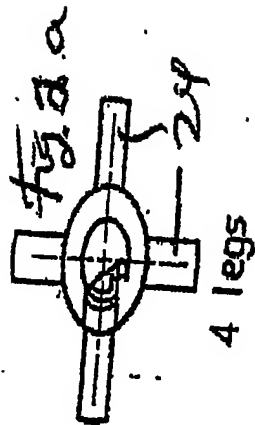
and a thread 821 around the legs 824 so as to provide  
with the threads 814 and 822 , a continuous thread. A tube  
834 is provided in the shank 820 of the wall anchor 810  
to provide more rigidity when the wall anchor 810 is  
S installed in the wall.



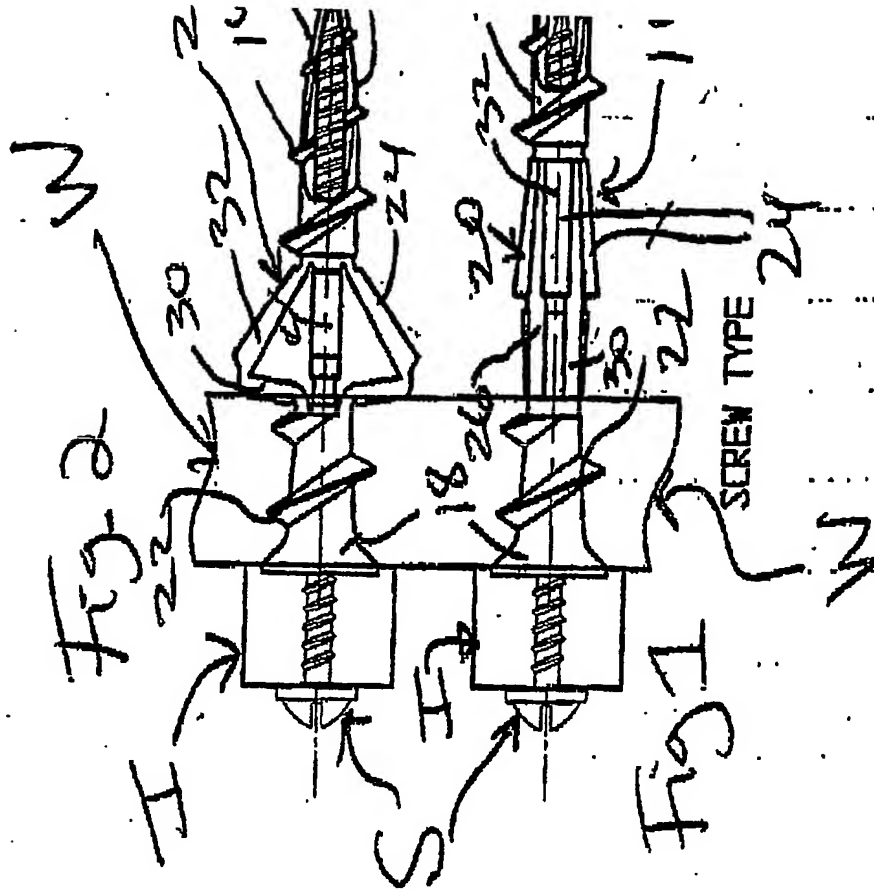
The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

- 5 1. An anchor for mounting to a hollow wall, comprising  
a proximal end adapted to be engaged by a rotatable tool  
to rotate said anchor about a longitudinal axis thereof  
and to cause it to gradually engage a wall, a distal end  
adapted to cut through the wall as said anchor is  
10 rotated, and a shank between said proximal and distal  
ends, said shank including at least one expandable leg,  
said expandable leg being in a collapsed position thereof  
when said anchor is rotated to mount it to the wall and  
being located distally passed a non visible surface of  
15 the wall once said anchor is mounted to the wall and is  
in a first position thereof, said anchor including a  
thread engaged in the wall when said anchor is in said  
first position, said anchor being adapted to receive a  
threaded fastener therein and to threadably engage the  
20 same distally of said leg such that sufficient rotation  
of the threaded fastener retracts said distal end towards  
said proximal end thereby causing said leg to displace to  
an expanded position thereof, said leg in said expanded  
position engaging the non visible surface of the wall.  
25

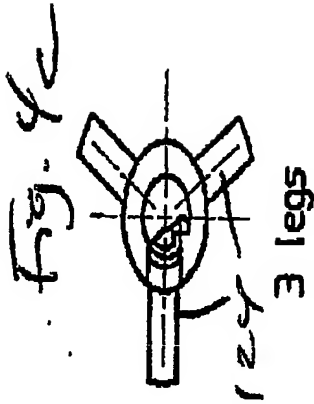
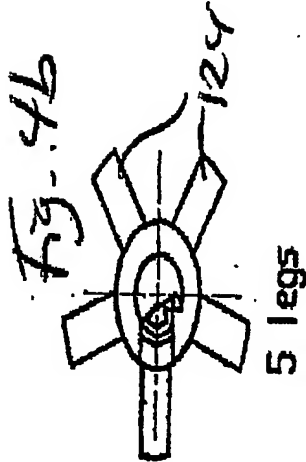
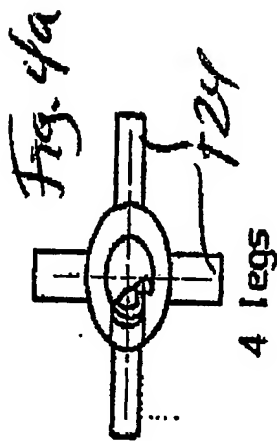
# Embodiment 1



12  
16  
14

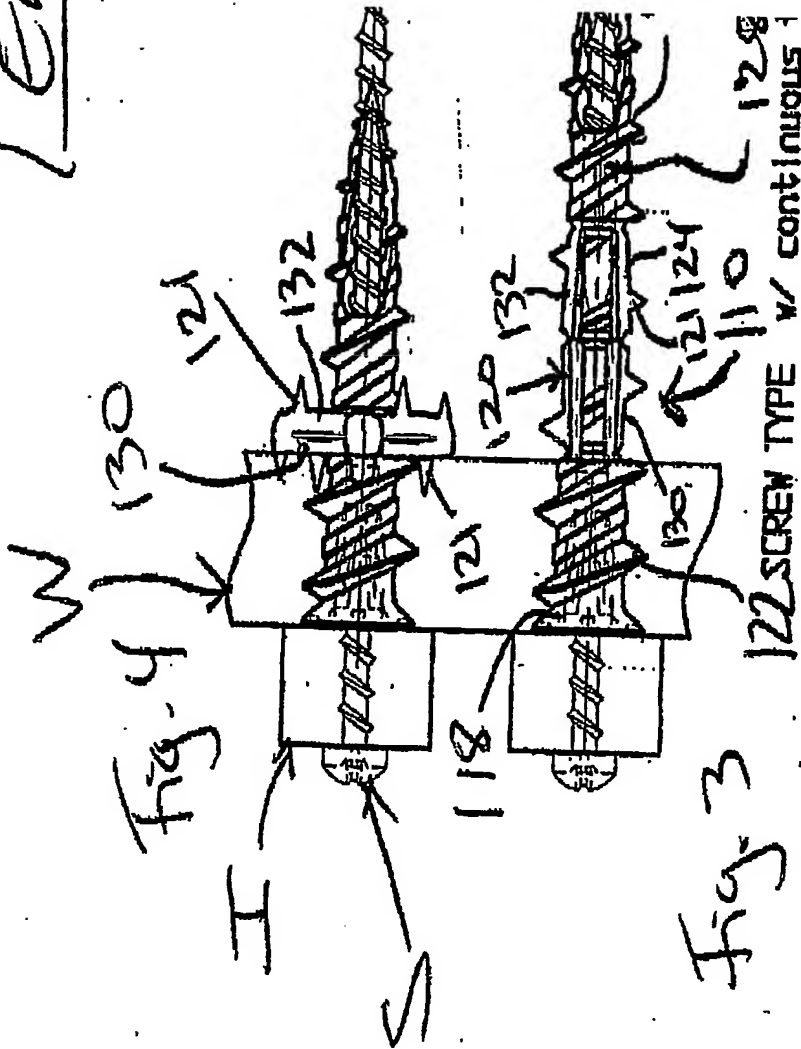


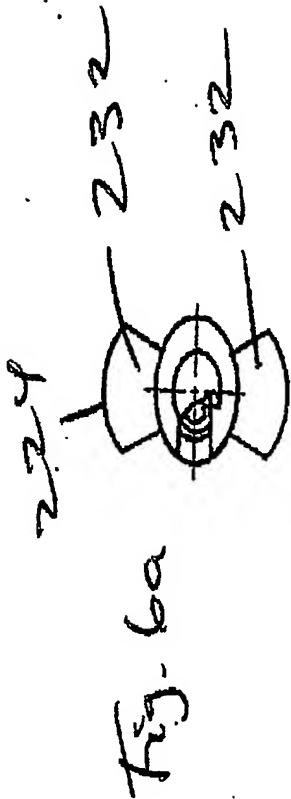
addiment 1b.2



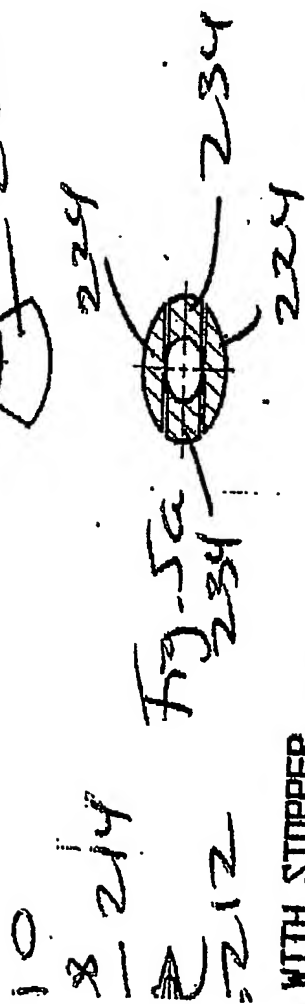
15  
short & equal legs  
thread grooves  
large pitch wood screw

61

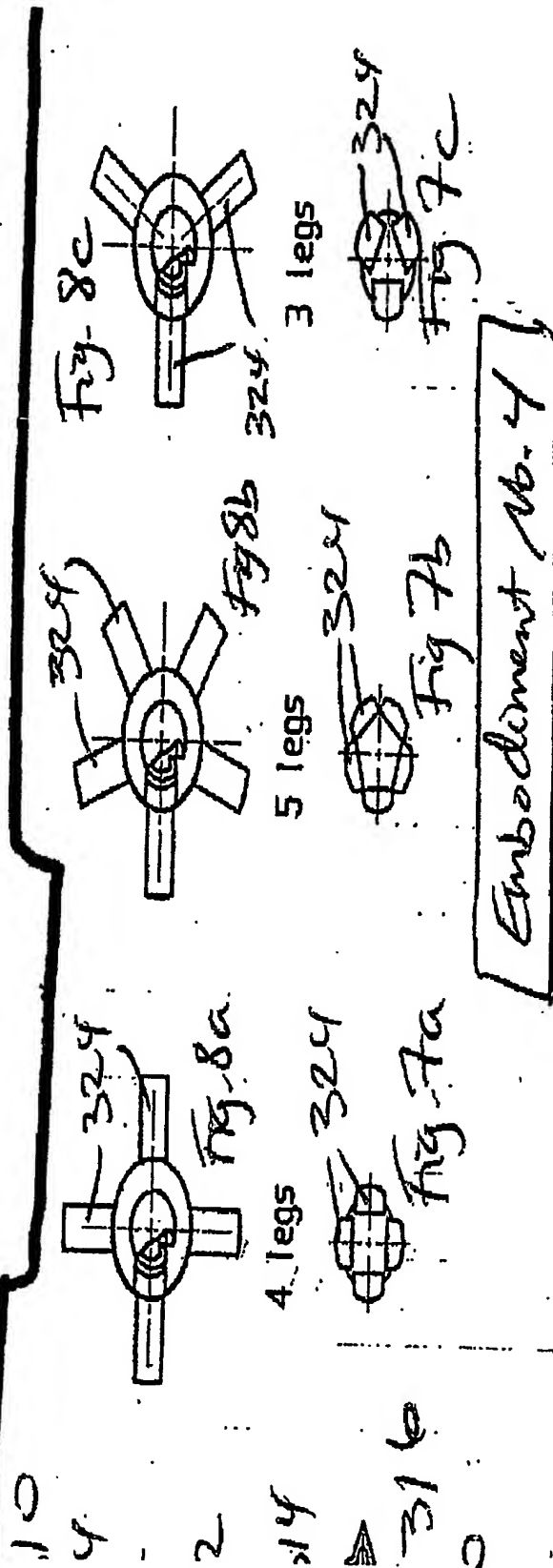


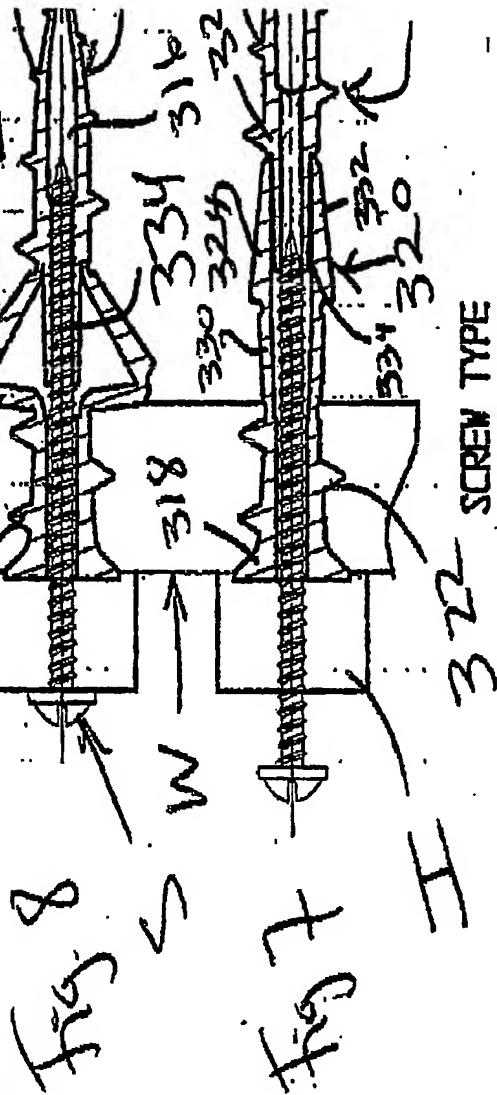
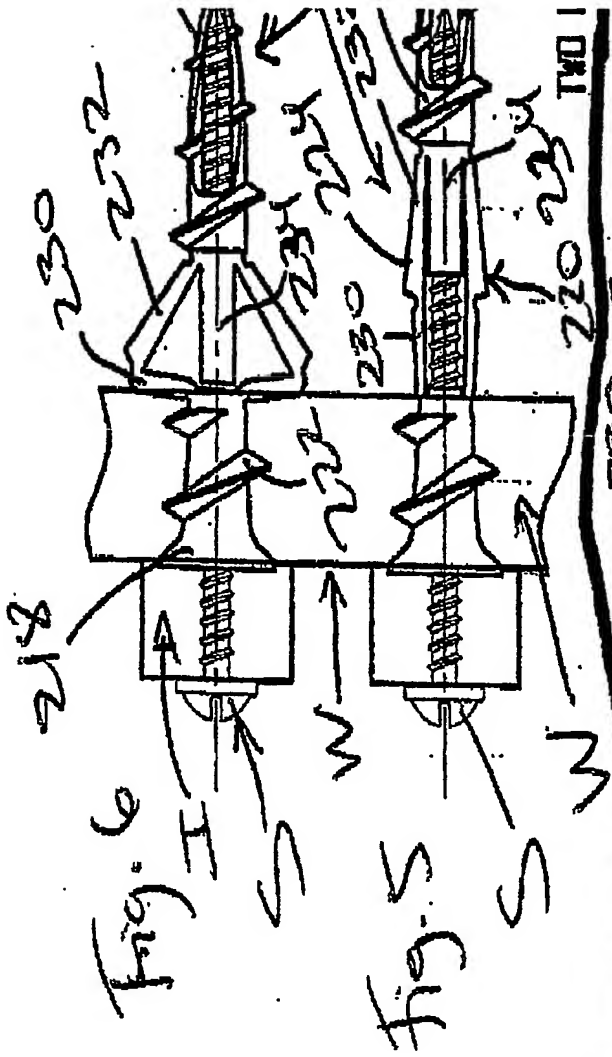


Embodiment  
No. 3

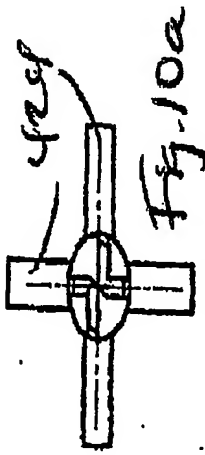


WITH STOPPER



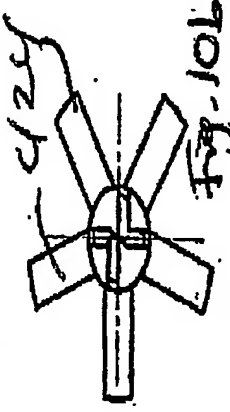


Embodiment No. 5



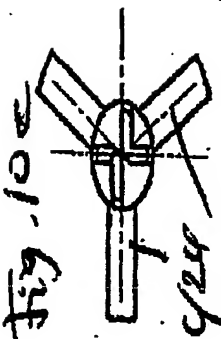
4 legs

Fig. 10a



5 legs

Fig. 10b



3 legs

Fig. 10c



Fig. 9a



Fig. 9b



Fig. 9c

Embodiment No. 6

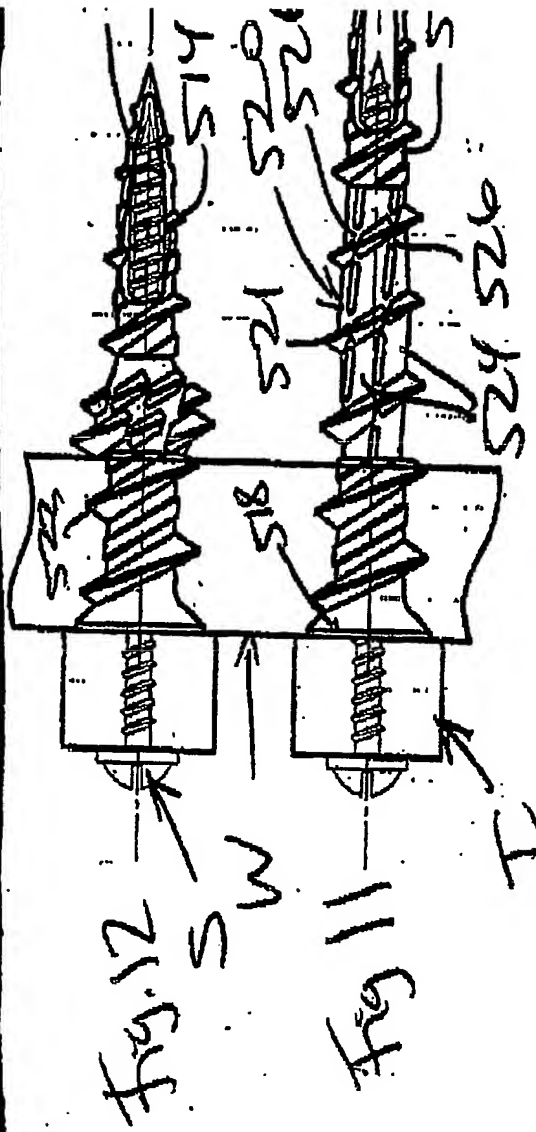
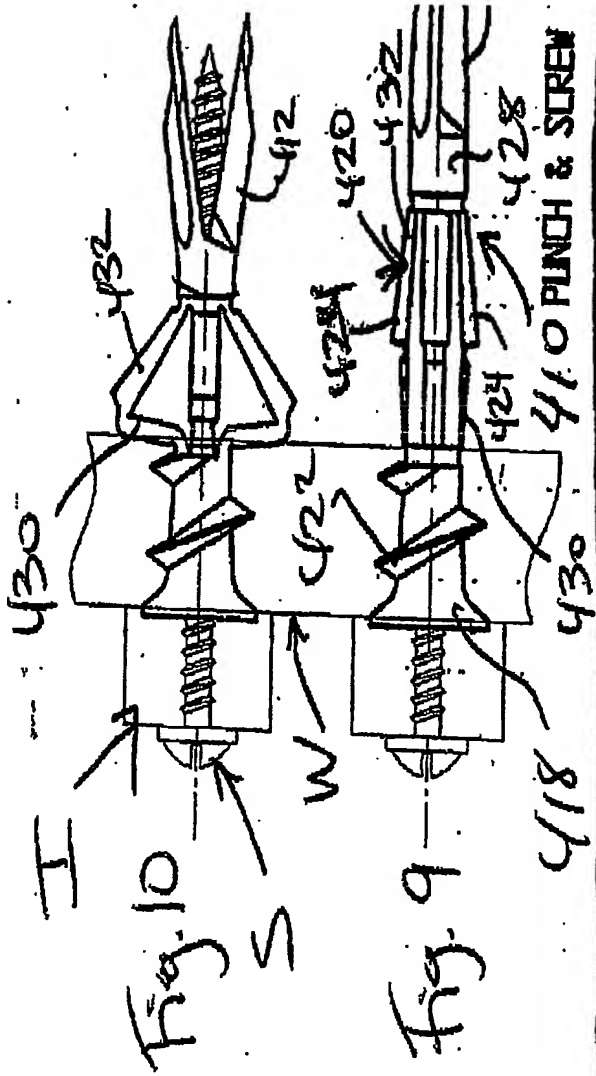
SREW & TWIST TYPE

w/continuous threads  
middle threads twist and collapse

510

516





Embodiment  
No. 7

724 610  
632 612



SCREW TYPE w/ two legs collapse inwards  
two legs collapse outwards

634 614

632 628



620 616

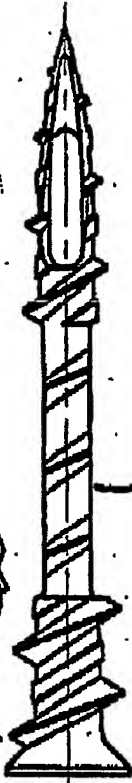
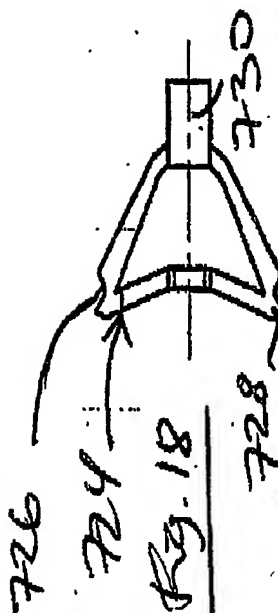
726 724 712



714 710 714 716



711 712



TWO PIECES SCREW TYPE

Embodiment  
No. 8

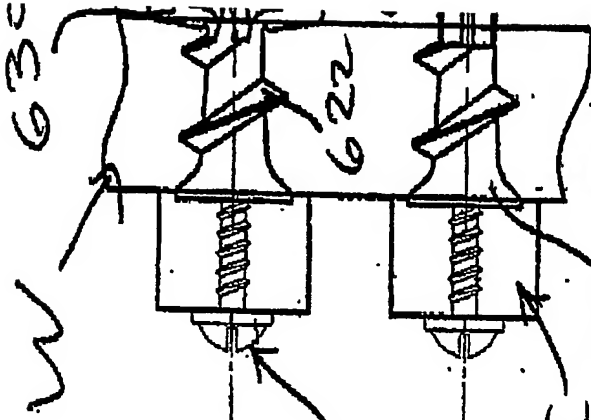


Fig. 14

Fig. 13

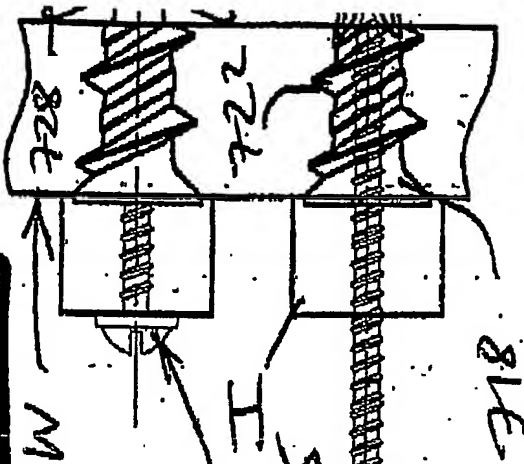
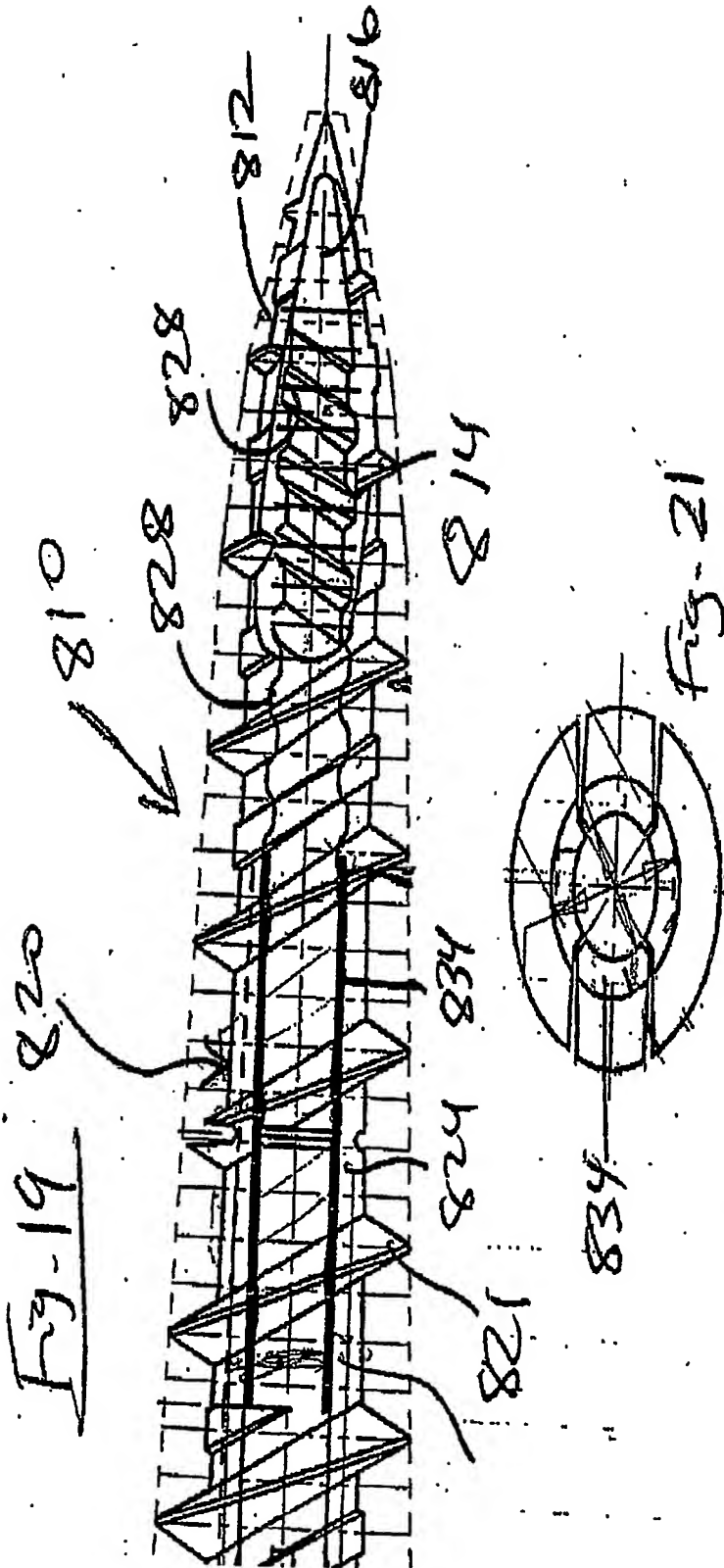


Fig. 16

Fig. 15



Indodanant No. 9

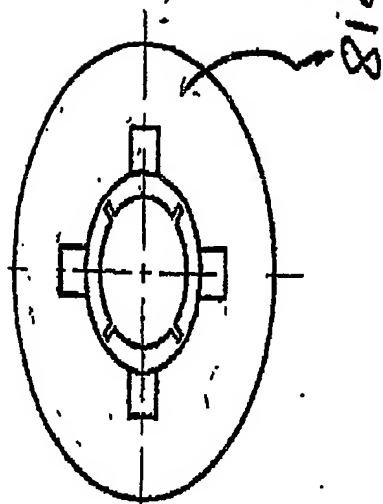
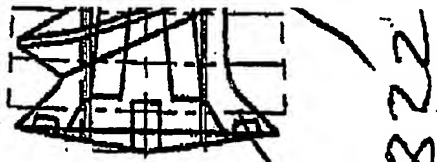
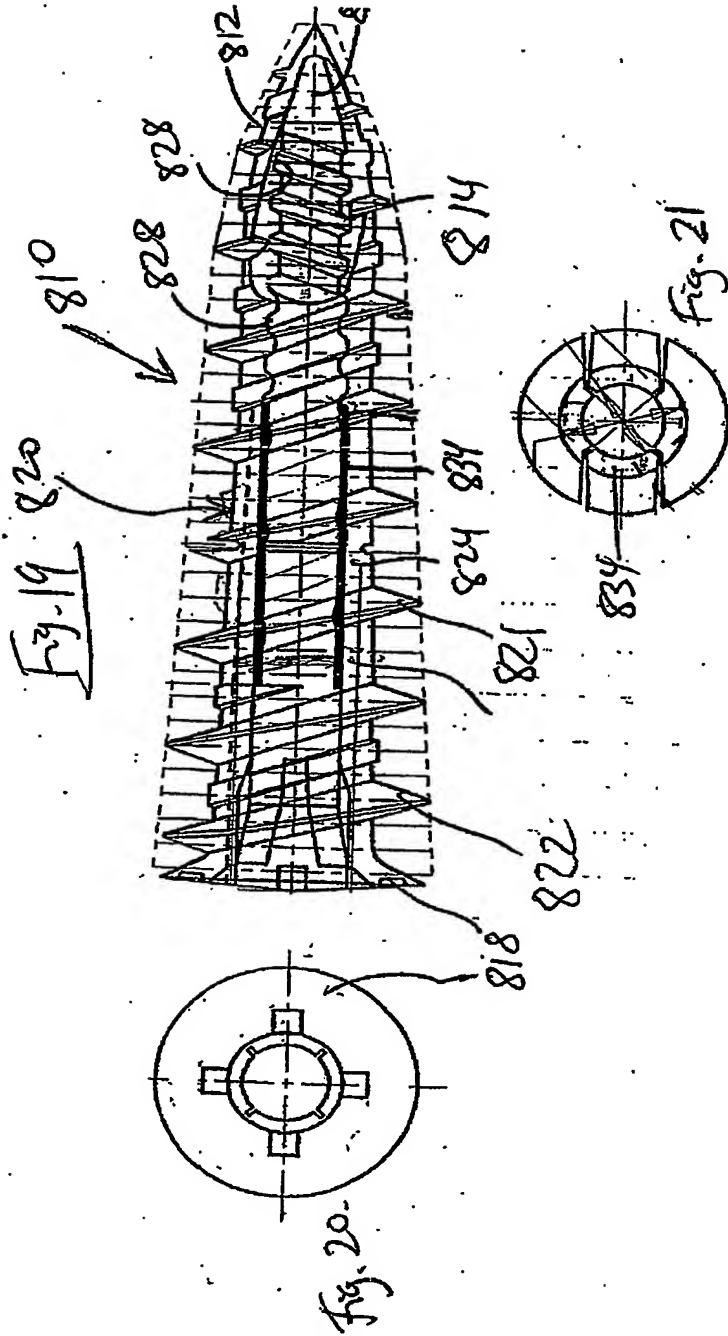


Fig. 20-



Embodiment No. 9

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